What Is Claimed Is:

1. A method for enhancing the production of an oxidative reaction product of a hydrocarbon comprising:

providing an electrically conductive catalyst composition comprising a vapor phase partial oxidation catalyst;

subjecting said electrically conductive catalyst composition to an electric current passing through said electrically conductive catalyst composition;

passing a hydrocarbon vapor over said electrically conductive catalyst composition;

wherein said vapor phase partial oxidation catalyst comprises a mixed metal oxide having the following empirical formula

$$A_aM_mN_nX_xO_o$$

wherein

A is at least one element selected from the group consisting of Mo and W,

M is at least one element selected from the group consisting of V and Ce,

N is at least one element selected from the group consisting of Te, Se and Sb,

X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Th, Yb, Lu, Au, Ag, Pd, Ga, Pr, Re, Ir, Nd, Y, Sm and Tb,

wherein

when a = 1, m = 0.01 to 1.0, n = 0.01 to 1.0, x = 0.001 to 1.0 and o is dependent on the oxidation state of the other elements;

and wherein said electrically conductive catalyst composition is subjected to said electric current prior to contacting the hydrocarbon vapor.

2. The method according to claim 1, wherein said electrically conductive catalyst composition comprises nanoparticles of said mixed metal oxide having the following empirical formula

$$A_aM_mN_nX_xO_o$$

wherein

A is at least one element selected from the group consisting of Mo and W,

M is at least one element selected from the group consisting of V and Ce,

N is at least one element selected from the group consisting of Te, Se and Sb,

X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Th, Yb, Lu, Au, Ag, Pd, Ga, Pr, Re, Ir, Nd, Y, Sm and Tb,

wherein

when a = 1, m = 0.01 to 1.0, n = 0.01 to 1.0, x = 0.001 to 1.0 and o is dependent on the oxidation state of the other elements.

3. The method according to claim 1, wherein said electrically conductive catalyst composition comprising a vapor phase partial oxidation catalyst is coated on a channel wall of a microchannel reactor.

4. A method for altering the oxidative reaction product of a vapor phase catalytic oxidation comprising:

providing an electrically conductive catalyst composition comprising a vapor phase partial oxidation catalyst;

subjecting said electrically conductive catalyst composition to a first electric current passing through said electrically conductive catalyst composition, said first electric current favoring the production of a partial oxidation reaction product of a first hydrocarbon;

passing said first hydrocarbon over said electrically conductive catalyst composition;

recovering said partial oxidation reaction product of said first hydrocarbon;

ceasing passage of said first hydrocarbon over said electrically conductive catalyst composition; subjecting said electrically conducting catalyst composition to a second electric current passing through said electrically conductive catalyst composition, said second electric current favoring the production of a partial oxidation reaction product of a second hydrocarbon

passing said second hydrocarbon over said electrically conductive catalyst composition;

recovering said partial oxidation reaction product of said second hydrocarbon;

wherein said electrically conductive catalyst composition is subjected to said first electric current prior to contacting the first hydrocarbon; and said electrically conductive catalyst composition is subjected to said second electric current prior to contacting the second hydrocarbon.

5. The method according to claim 4, wherein said electrically conductive catalyst composition comprises a mixed metal oxide of the following empirical formula

$$A_aM_mN_nX_xO_o$$

wherein

A is at least one element selected from the group consisting of Mo and W,

M is at least one element selected from the group consisting of V and Ce,

N is at least one element selected from the group consisting of Te, Se and Sb,

X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Th, Yb, Lu, Au, Ag, Pd, Ga, Pr, Re, Ir, Nd, Y, Sm and Tb,

wherein

when a = 1, m = 0.01 to 1.0, n = 0.01 to 1.0, x = 0.001 to 1.0 and o is dependent on the oxidation state of the other elements.

6. A method for enhancing the production of an oxidative reaction product of a hydrocarbon comprising:

providing an electrically conductive catalyst composition comprising a vapor phase partial oxidation catalyst;

subjecting said electrically conductive catalyst composition to an electric current passing through said electrically conductive catalyst composition;

passing an oxidative gas over said electrically conductive catalyst;

then, passing a hydrocarbon vapor over said electrically conductive catalyst composition;

and wherein said electrically conductive catalyst composition is subjected to said electric current prior to contacting the hydrocarbon vapor.

7. The method according to claim 6, wherein the electrically conductive catalyst composition comprises a mixed metal oxide having the following empirical formula

$$A_aM_mN_nX_xO_o$$

wherein

A is at least one element selected from the group consisting of Mo and W,

M is at least one element selected from the group consisting of V and Ce,

N is at least one element selected from the group consisting of Te, Se and Sb,

X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Th, Yb, Lu, Au, Ag, Pd, Ga, Pr, Re, Ir, Nd, Y, Sm and Tb,

wherein

when a = 1, m = 0.01 to 1.0, n = 0.01 to 1.0, x = 0.001 to 1.0 and o is depenedent on the oxidation state of the other elements.

8. The method according to claim 6, wherein said electrically conductive catalyst composition comprises nanoparticles comprising a mixed metal oxide of the following empirical formula

$$A_aM_mN_nX_xO_o$$

wherein

A is at least one element selected from the group consisting of Mo and W,

M is at least one element selected from the group consisting of V and Ce,

N is at least one element selected from the group consisting of Te, Se and Sb,

X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Th, Yb, Lu, Au, Ag, Pd, Ga, Pr, Re, Ir, Nd, Y, Sm and Tb,

wherein

when a = 1, m = 0.01 to 1.0, n = 0.01 to 1.0, x = 0.001 to 1.0 and o is dependent on the oxidation state of the other elements.

9. The method according to claim 6, wherein said electrically conductive catalyst composition comprising a vapor phase partial oxidation catalyst is coated on a channel walls of a microchannel reactor.